

WHAT IS CLAIMED IS:

1. An image reading method which reads an image on an image recording medium by a visible light, comprising the steps of:

reading by scanning a specified detecting light in a one-dimensional direction using an optical path of said visible light; and

detecting at least one of a foreign matter which adheres and a scratch which exists in the optical path of said visible light based on continuity of change of light quantity data of the thus read specified detecting light in said one-dimensional direction.

2. The image reading method according to claim 1, wherein, when said change of the thus read light quantity data is detected in a continuous state in said one-dimensional direction at a specified reading position perpendicular to said one-dimensional direction, at least one of said foreign matter and scratch is detected.

3. The image reading method according to claim 1, wherein at least one of the foreign matter which adheres and the scratch which exists in said optical path is detected by detecting the change of the light quantity data

in a streak form that has grown up in a same sensor position by means of a line sensor for said specified detecting light.

4. The image reading method according to claim 3, wherein scanning in said one-dimensional direction for reading said specified detecting light by making use of the optical path of said visible light is performed by allowing said image recording medium and said line sensor to move relatively by means of transferring said image recording medium in relation to said line sensor, or by reading said specified detecting light with said line sensor for a specified period of time in a same way as in a case of transferring said image recording medium in relation to said line sensor, if said image recording medium is disposed outside of said optical path.

5. The image reading method according to claim 3, wherein scanning in said one-dimensional direction for reading said specified detecting light by making use of the optical path of said visible light is performed by allowing said image recording medium or said specified detecting light and said line sensor to move relatively by means of scanning by transferring a mirror in said optical path.

6. The image reading method according to claim 1, further comprising the step of issuing an alarm, when at least one of the foreign matter which adheres or the scratch which exists in said optical path is detected.

7. The image reading method according to claim 1, wherein at least one of said foreign matter and said scratch which adheres to or exists on an optical element in said optical path.

8. The image reading method according to claim 7, wherein said optical element is at least one of a diffusion plate and a mirror.

9. The image reading method according to claim 7, wherein a position of said optical element is changed in accordance with a detection result of at least one of the foreign matter and the scratch which adheres to or exists on the optical element in said optical path.

10. The image reading method according to claim 1, wherein an area in which at least one of the foreign matter

which adheres and the scratch which exists in said optical path is detected is enlarged.

11. The image reading method according to claim 1, wherein said specified detecting light is said visible light.

12. The image reading method according to claim 11, wherein, when said visible light is read by scanning in said one-dimensional direction by making use of the optical path of said visible light, said image recording medium is removed from the optical path of said visible light.

13. The image reading method according to claim 1, wherein said specified detecting light is an invisible light.

14. The image reading method according to claim 1, wherein at least one of the foreign matter and the scratch on said image reading medium is detected by the invisible light.

15. The image reading method according to claim 14, wherein focusing positions of said specified detecting

light and said invisible light are changed from one another in accordance with whether at least one of the foreign matter which adheres and the scratch exists in said optical path is detected by said specified detecting light or at least one of the foreign matter and the scratch on said image recording medium is detected by said invisible light.

16. The image reading method according to claim 15, wherein said specified detecting light is the invisible light, and wherein focusing positions of said invisible light are changed from one another in accordance with whether at least one of the foreign matter which adheres and the scratch which exists in said optical path is detected by said invisible light or at least one of the foreign matter and the scratch on said image recording medium is detected by said invisible light.

17. An image reading apparatus, comprising:

a first reading unit for reading an image on an image recording medium by a visible light;

a second reading unit for reading a specified detecting light by scanning it in a one-dimensional direction by making use of an optical path of said visible light; and

Sub 20

a first detecting unit for detecting at least one of a foreign matter which adheres and a scratch which exists in an optical path of said visible light based on continuity of change of light quantity data of the specified detecting light read by said second reading unit in said one-dimensional direction.

18. The image reading apparatus according to claim 17, wherein said first detecting unit detects at least one of said foreign matter and the scratch by detecting the change of the light quantity data continuously in said one-dimensional direction at a specified reading position which is perpendicular to said one-dimensional direction.

19. The image reading apparatus according to claim 17, wherein said second reading unit comprises a line sensor and a moving device for relatively moving said specified detecting light in said one-dimensional direction in relation to said line sensor, and wherein said first detecting unit detects at least one of the foreign matter which adheres and the scratch which exists in said optical path by detecting the change of the light quantity data in a streak form that has grown up in a same sensor position of said line sensor.

20. The image reading apparatus according to claim 19, wherein said second reading unit allows said image recording medium and said line sensor to move relatively by transferring said image recording medium in relation to said line sensor by means of the moving device, or by reading said specified detecting light with said line sensor for a specified period of time in a same way as in a case of transferring said image reading medium in relation to said line sensor, if said image recording medium is disposed outside of said optical path.

21. The image reading apparatus according to claim 19, wherein said second reading unit allows said image recording medium or said specified detecting light and said line sensor to move relatively by means of scanning by transferring the mirror in said optical path with said moving device.

22. The image reading apparatus according to claim 17, further comprising an alarming device for issuing an alarm when said first detecting device detects at least one of the foreign matter which adheres and the scratch which exists in said optical path.

23. The image reading apparatus according to claim 17, wherein at least one of said foreign matter and said scratch which adheres to or exists on an optical element disposed in the optical path of said first reading device.

24. The image reading apparatus according to claim 23, wherein said optical element is at least one of a diffusion plate and a mirror.

25. The image reading apparatus according to claim 23, further comprising a first changing device for changing a position of said optical element when said first detecting unit detects at least one of the foreign matter and the scratch which adheres to or exists on the optical element in said optical path.

26. The image reading apparatus according to claim 17, further comprising an enlarging device for enlarging an area in which at least one of the foreign matter which adheres and the scratch which exists in said optical path is detected.

27. The image reading apparatus according to claim 17, wherein said first detecting unit uses said visible light as said specified detecting light.

28. The image reading apparatus according to claim 27, wherein said second reading unit reads said visible light by scanning in said one-dimensional direction by making use of the optical path of said visible light in a state that said image recording medium is removed from the optical path of said visible light.

29. The image reading apparatus according to claim 17, wherein said first detecting unit uses an invisible light as said specified detecting light.

30. The image reading apparatus according to claim 17, further comprising a second detecting unit for detecting at least one of the foreign matter and the scratch on said image recording medium by the invisible light.

31. The image reading apparatus according to claim 30, further comprising a second changing device for changing focusing positions of said specified detecting light and said visible light from one another in accordance with

Sub 20-1
whether at least one of the foreign matter which adheres and the scratch which exists in said optical path is detected by said specified detecting light or at least one of the foreign matter and the scratch on said image recording medium is detected by said invisible light.

32. The image reading apparatus according to claim 30, wherein said first detecting unit and said second detecting unit are identical to each other using said invisible light; further comprising:

a second changing device for changing focusing positions of said invisible light from one another in accordance with whether at least one of the foreign matter which adheres and the scratch which exists in said optical path is detected by said invisible light or at least one of the foreign matter and the scratch on said image recording medium is detected by said invisible light.

33. A method of discriminating a defect of image data produced from an image which has been formed on an image recording medium, comprising:

a first detecting step of detecting a first optical defect existing in an optical system which reads said image data from said image recording medium; and

a second detecting step of detecting a second optical defect existing on said image recording medium.

34. The method of discriminating defect of the image data according to claim 33, wherein said first and second detecting steps are based on the same detecting method using an invisible light.

35. The method of discriminating the defect of image data according to claim 34, wherein, in said first detecting step, a focusing position of said invisible light is set on said image recording medium, and wherein, in said second detecting step, the focusing position of said invisible light is removed from said image recording medium.